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Pharmacognostical Studies of Tecoma stans (L.) Juss. Ex Kunth. Bark

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Abstract

Tecoma stans (L.) Juss. Ex Kunth. belongs to the family Bignoniaceae. It is native to India. The barks of the plant are used medicinally for the treatment of several skin and fungal infections. The present paper deals with the pharmacognostical studies of ibark of the plant. Dried bark of the plant were evaluated for physicochemical parameters, extraction and preliminary phytochemical screening.

Keywords: Tecoma stans (L.) Juss. Ex Kunth., Bark, Standardization Parameters

Introduction

Nature keeps in her green bag the secret of healthy life on this earth perhaps in the luxuriant green cover, the biodiversity. With the coming of chemical revolution, the medicinal plants, which were once used by the traditional medicine men, have found wide acceptance and a place of pride in the modern system of medicine. They possessed chemical compounds of great biological activity and are referred as wonder drugs, which have magical properties and used to cure some of the incurable diseases. [1-2]

Our country is now beginning to search her roots in the past and revive her lost glory of the traditional system of medicine, which flourished here for several centuries and contributed much to the development of the medical science of world. To alleviate the sufferings of her large ever-growing population, she has to revive the Traditional Folklore Medicine and bring it into the mainstream of National Health-Care Programme.

Plants have been utilized as medicines for thousands of years. These medicines initially took the form of crude drugs such as tinctures, teas, poultices, powders and other herbal formulations. The specific plants to be used and the methods of application for particular ailments were passed down through oral tradition. Eventually information regarding medicinal plants was recorded in herbal phamacopoeias.

Modern allopathic medicine has its roots in ancient medicine, and it is likely that many important new remedies will be discovered and commercialized in the future, as it has been till now, by following the leads provided by traditional knowledge and experiences. While European traditions are particularly well known and have had a strong influence on modern western pharmacognosy, almost all societies have well-established herbal traditions, some of which have hardly been studied

at all. The study of these traditions will not only provide an insight into how the field has developed but it is also a fascinating example of our ability to develop a diversity of cultural practices. [3-4]

Tecoma stans (L.) Juss. Ex Kunth fam. Bignoniaceae; Habitat: Wild throughout India; Common Name: Piliya (H), Yellow trumpetbusy, Yello bell (E); Parts Used: Roots, Leaves, Bark, Bark. Traditionally all parts of the plant is used as medicine for the cure of the treatment of various diseases. Leaves, barks and roots have been used for a variety of purposes in the field of herbal medicine. Bark shows smooth muscle relaxant, mild cardio tonic and chlorotic activity. Applications include the experimental treatment of diabetes, digestive problems, control of yeast infections and other medicinal applications. It contains several compounds that are known for their catnip like effects on felines. The root of the plant is reported to be a powerful diuretic, vermifuge and tonic. A grinding of the root of Tecoma stans and lemon juice is reportedly used as an external application and also taken internally in small quantities as a remedy for snake and rat bites. [5]

Material and Methods

Collection of herbs and their authentication

The plant parts viz., TSF: Tecoma stans (Bark), was collected in the months of December 2019 from the various local sites of Malwa region of Madhya Pradesh and identified & authenticated by Dr. S. N. Dwivedi, Prof. and Head, Department of Botany, Janata PG College, A.P.S. University, Rewa, (M.P.) and was deposited in our Laboratory. Voucher specimen No. P/TS-F/23 was allotted.

Pharmacognostical evaluation [6-9]

Macroscopic studies

The macroscopy of parts of the plant such as color, odor, size, shape, taste, surface characters and fractures were carried out.

Physicochemical evaluation

The dried Bark of Tecoma stans was subjected to standard procedure for the determination of various physicochemical parameters.

Determination of Foreign Organic Matter (FOM)

Accurately weighed 100 g of the drug sample and spread it out in a thin layer. The foreign matter should be detected by inspection with the unaided eye or by the use of a lens (6X). Separate and weigh it and the percentage present was calculate.

Determination of Moisture content (LOD)

Place about 10 g of drug (without preliminary drying) after accurately weighing in a tared evaporating dish and kept in oven at 105^0 C for 5 hours and weigh. The percentage loss on drying with reference to the air dried drug was calculated.

Determination of Ash Value

The determination of ash values is meant for detecting low-grade products, exhausted drugs and sandy or earthy matter. It can also be utilized as a mean of detecting the chemical constituents by making use of water-soluble ash and acid insoluble ash.

Total Ash

Accurately about 3 gms of air dried powder was weighed in a tared silica crucible and incinerated at a temperature not exceeding 450^0C until free from carbon, cooled and weighed and then the percentage of total ash with reference to the air dried powdered drug was calculated. The percentage of total ash with reference to the air-dried drug was calculated.

Acid Insoluble Ash

The ash obtained in the above method was boiled for 5 minutes with 25ml of dilute HCl. The residue was collected on ash less filter paper and washed with hot water, ignited and weighed. The percentage of acid insoluble ash was calculated with reference to the air dried drug.

Water Soluble Ash

The ash obtained in total ash was boiled for 5 minutes with 25 ml of water. The insoluble matter was collected on an ash less filter paper, washed with hot water and ignited to constant weight at a low temperature. The weight of insoluble matter was subtracted from the weight of the ash. The difference in weights represents the water soluble ash. The percentage of water soluble ash with reference to the air dried drug was calculated.

Determination of Swelling Index

Swelling index is determined for the presence of mucilage in the seeds. Accurately weigh 1 g of the seed and placed in 150 ml measuring cylinder, add 50 ml of distilled water and kept aside for 24 hours with occasional shaking. The volume occupied by the seeds after 24 hours of wetting was measured.

Determination of Extractive value

This method determines the amount of active constituents extracted with solvents from a given amount of medicinal plant material. It is employed for materials for which as yet no suitable chemical or biological assay exists.

Cold Maceration

Place about 4.0g of coarsely powdered air-dried material, accurately weighed, in a glass-stoppered conical flask. Macerate with 100ml of the solvent specified for the plant material concerned for 6 hours, shaking frequently, then allow to stand for 18 hours. Filter rapidly taking care not to lose any solvent, transfer 25 ml of the filtrate to a tared flat-bottomed dish and evaporate to dryness on a water bath. Dry at 105°C for 6 hours, cool in a desiccator for 30 minutes and weigh without delay. Calculate the content of extractable matter in mg per g of air dried material. For ethanol-soluble extractable matter, use the concentration of solvent specified in the test procedure for the plant material concerned; for water-soluble extractable matter, use water as the solvent.

Successive extraction of selected herbs

Sample were shattered and screened with 40 mesh. The shade dried coarsely powdered plant matertial (250 gms) were loaded in Soxhlet apparatus and was extracted with petroleum ether (60-62°C), Chloroform, ethanol and water until the extraction was completed. After completion of extraction, the solvent was removed by distillation. The extracts were dried using rotator evaporator. The residue was then stored in dessicator and percentage yield were determined.

Preliminary phytochemical screening of extracts

The various extracts obtained after extraction were subjected for phytochemical screening to determine the presence of various phytochemical present in the extracts. The standard procedures were adopted to perform the study.

Results and Discussion

The macroscopy of TSB: Tecoma stans (L.) Juss. Ex Kunth (Bark) such as color, odor, size, shape, taste, surface characters and fractures was carried out. The result was presented in table 1. The dried plant parts of TSB: Tecoma stans (L.) Juss. Ex Kunth (Bark) were subjected to standard procedure for the determination of various physicochemical parameters. The results were presented in table 2. The shade dried coarsely powdered plant material of TSB: Tecoma stans (L.) Juss. Ex Kunth (Bark) was extracted with petroleum ether, Chloroform, ethanol and water. The extracts obtained were evaluated for pH, color and % yield. The results are presented in table 3. The various extract obtained after extraction of plant material TSB: Tecoma stans (L.) Juss. Ex Kunth (Bark) were subjected for phytochemical screening to determine the presence of various phytochemical present in the extracts. The standard procedure was adopted to perform the study.

Table 1: Macroscopic features of Tecoma stans (L.) Juss. Ex Kunth (Bark)

S/No.	Parameters	TSB
1.	Color	Light to Pale brown
2.	Odor	Characteristics
3.	Taste	Sweet
4.	Shape	Irregular
5.	Size	Variable
6.	Surface character	Smooth
7.	Fractures	Smooth

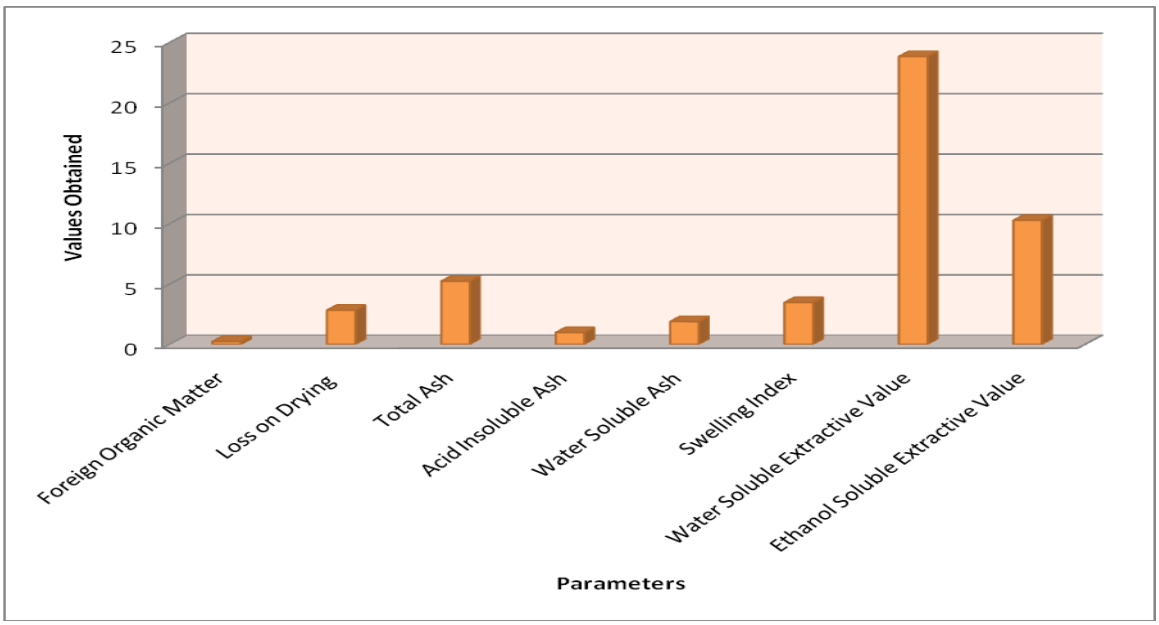
Abbr.: TSB: Tecoma stans (L.) Juss. Ex Kunth (Bark)

Table 2: Physicochemical Evaluation of Bark of Tecoma stans (L.) Juss. Ex Kunth

S/No.	Parameters	Values Obtained
1.	Foreign Organic Matter	0.13±0.20
2.	Loss on Drying	2.01±1.01
3.	Total Ash	8.69±0.21
4.	Acid Insoluble Ash	1.18 ±0.13
5.	Water Soluble Ash	2.12±0.11
6.	Swelling Index	2.89±0.01
7.	Water Soluble Extractive Value	28.23±4.15
8	Ethanol Soluble Extractive Value	18.37±0.04

Note: All values are expressed as Mean±SEM, n=3

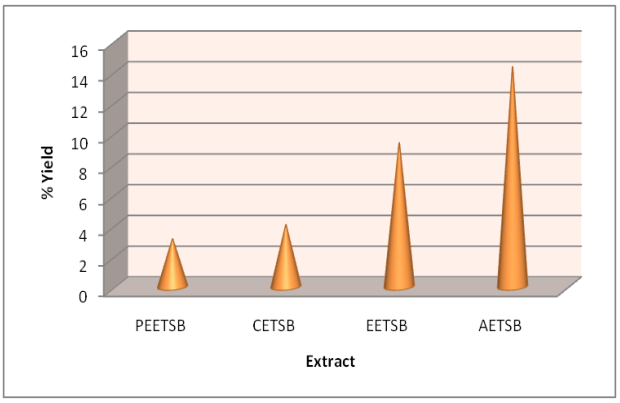
Fig. 1: Photo of Tecoma stans (L.) Juss. Ex Kunth (Bark)



Graph 1: Physicochemical Evaluation of Bark of Tecoma stans (L.) Juss. Ex Kunth

Table 3: Estimation of % Yield of Extract of Bark of Tecoma stans (L.) Juss. Ex Kunth

S/No.	Extract	Parameters			
		Nature of Extract	Color	pH	% Yield (w/w)
1.	PEETSB	Semi Solid	Yellowish green	6.9	3.11
2.	CETSB	Semi solid	Dark Yellow	7.03	4.03
3.	EETSB	Semi Solid	Light Yellow	7.01	9.36
4.	AETSB	Solid Powder	Yellow	7.00	14.29



Graph 2: % Yield of Extract of Bark of Tecoma stans (L.) Juss. Ex Kunth

Table 4: Preliminary Phytochemical Screening of Bark of Tecoma stans (L.) Juss. Ex Kunth

S/No.	Constituents	Flower Extract			
		PEETSB	CETSB	EETSB	AETSB
1.	Carbohydrates	-	+	+	+
2.	Glycosides	-	-	+	+
3.	Alkaloids	-	-	+	+
4.	Protein & Amino acid	-	-	+	+
5.	Tannins & Phenolic compounds	-	-	+	+
6.	Flavonoids	-	-	+	+
7.	Fixed oil and Fats	-	-	+	+
8.	Steriods & Triterpenoids	+	+	-	-
9.	Waxes	-	-	+	-
10.	Mucilage & Gums	-	-	+	+

+ = Present; - = Absent

Conclusion

The present work was undertaken to revel the pharmacognostical profile of T. stans bark. In this study morphological, physicochemical, extraction and preliminary phytochemical screening of the selected plant material was done and reported.

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